

Kajian penghematan energi penerangan jalan umum (PJU) dengan penggunaan lampu PJU hemat energi dan peredupan cahaya (Dimming) dengan mempertimbangkan intensitas aktivitas warga (studi kasus di Kota Administrasi Jakarta Pusat) = A study of energy efficiency with energy efficient lamps in street lighting system and dimming system based on the intensity of citizens activities (the case study of Central Jakarta) / Emanas Fasianti

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Abstrak

Perkembangan fisik kota mengakibatkan peningkatan kebutuhan penerangan jalan dan konsumsi energi listrik. Di tengah isu lingkungan dan krisis energi yang dihadapi kota-kota, penggunaan lampu PJU hemat energi LED seperti yang dilakukan kota di Jakarta berpotensi memberikan penghematan energi dan menurunkan dampak terhadap lingkungan, namun membutuhkan biaya investasi yang besar sehingga perlu dikombinasikan dengan skenario penghematan energi yang lain seperti peredupan cahaya (dimming). Skenario dimming perlu dibuat dengan menyesuaikan intensitas aktivitas warga berdasarkan pola persebaran titik PJU pada struktur dan pola ruang kota. Dengan mengambil studi kasus di Jakarta Pusat dan menggunakan pendekatan analisis deskriptif untuk menganalisis pola spasial PJU, hasil pengukuran volume lalu lintas, dan hasil perhitungan potensi penghematan, diperoleh hasil bahwa (1) pola spasial PJU berdasarkan struktur dan pola ruang menunjukkan persebaran pelayanan titik PJU yang disesuaikan dengan hierarki sistem pusat kegiatan dan kebutuhan pelayanan, (2) Intensitas lalu lintas yang bervariasi pada kawasan pusat kegiatan dan permukiman menunjukkan kebutuhan penerangan jalan yang bervariasi sehingga dimming bisa dilakukan dengan nilai dan periode yang bervariasi menyesuaikan intensitas lalu lintas, serta (3) skenario dimming yang diterapkan bersama dengan penggunaan lampu PJU LED smart system di Jakarta Pusat berpotensi mengoptimalkan penurunan konsumsi energi listrik, tagihan listrik PJU serta emisi CO₂.

.....Physical development of the city resulting in increased demand of street lighting and consumption of electrical energy in the city. Among environmental issues and the crises of energy in the city, the use of energy efficient lamps LED and smart sytem in Jakarta has potential to provide energy savings and reduce the impact on the environment, but this project requires big investment costs so need to be combined with other energy saving scenarios such as dimming system. Dimming system need to be made by adjusting the intensity of the citizens activities based on the distribution pattern of street lighting system on the structure and functional zone of urban space. By taking a case study in Central Jakarta and using descriptive analysis approach to analyse the spatial pattern of street lighting, the traffic measurement result, and the calculation of saving, it is found that (1) spatial pattern of Central Jakarta street lighting system shows the distribution of street lighting point service has been adjusted to the hierarchy of city center system of activities and service needs, (2) the varying traffic intensity at the center of activity and residential area shows the need for varied street lighting so that dimming can be done with the varying values and periods based on the traffic intensity and (3) dimming scenarios applied with the use of LED smart systems in Central Jakarta street lighting system, potentially optimize the reduction of the consumption of electrical peak load, local

government expenditure and greenhouse gas emissions.